

CLAIMS

1. A digital television receiver module for use in a digital television receiver for receiving a digital television signal, comprising:
 - 5 first connecting means having a plurality of terminals for electrically connecting to one external substrate among external substrates which can receive digital television signals of broadcasting systems different from each other;
 - decoding means for executing a decoding processing on a digital television signal inputted from a demodulator provided on said external substrate via said first connecting means, so as to convert the digital television signal into a video signal and an audio signal, and for outputting the video signal and audio signal via said first connecting means;
 - 10 control means for controlling an operation of said digital television receiver module; and
 - 15 interface means which is connected to one conditional access module among a plurality of types of conditional access modules having electrical specifications different from each other via said first connecting means, and which is connected to said demodulator, said decoding means, and said control means, said interface means executing input and output processings on a plurality of signals communicated among said demodulator, said conditional access module, said decoding means, and said control means,
 - 20 wherein said control means controls said interface means by switching over among types of signals communicated via said first

connecting means, so as to conform to electrical specifications of a connected conditional access module, in response to at least one of a broadcasting system of an inputted digital television signal and a type of said connected conditional access module.

- 5 2. The digital television receiver module as claimed in claim 1,
 wherein said interface means outputs a digital television signal
 inputted from said demodulator to said decoding means and said
 conditional access module via said first connecting means.
- 10 3. The digital television receiver module as claimed in claim 1 or
 2,
 wherein said interface means comprises a plurality of buffers, and
 wherein said control means controls on-off states of respective
 buffers so as to control the input and output processings.
- 15 4. The digital television receiver module as claimed in any one of
 claims 1 to 3,
 wherein, when said conditional access module is not connected to
 said control means via said first connecting means, said control means
 controls said interface means so that a detection signal from said
 conditional access module is outputted to said control means.
- 20 5. The digital television receiver module as claimed in claim 2 or
 3,
 wherein, when a first type conditional access module among said
 plurality of types of conditional access modules is connected to said
 control means via said first connecting means, said control means
 controls said interface means so that a digital television signal inputted

from said connected conditional access module via said first connecting means is outputted to said decoding means.

6. The digital television receiver module as claimed in claim 5,
wherein said control means outputs a first power-supply voltage
5 to said connected conditional access module via said first connecting
means, and controls said interface means so that an address signal and
a data signal from said control means are outputted to said connected
conditional access module via said first connecting means on the first
power-supply voltage.

- 10 7. The digital television receiver module as claimed in claim 5 or
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wherein said first type conditional access module is a conditional
access module of a Common Interface.

8. The digital television receiver module as claimed in claim 2 or
15 3,

wherein, in such an initial state that a second type conditional
access module among said plurality of types of conditional access
modules is connected to said control means via said first connecting
means, said control means controls said interface means, so that a
20 second power-supply voltage is outputted to said connected conditional
access module via said first connecting means, a digital television signal
inputted from said connected conditional access module via said first
connecting means is outputted to said decoding means, and an address
signal and a data signal from said control means are outputted to said
25 connected conditional access module via said first connecting means on

the second power-supply voltage.

9. The digital television receiver module as claimed in claim 8,
wherein, in such an operating state that is after the initial state
that said second type conditional access module among said plurality of
5 types of conditional access modules is connected to said control means
via said first connecting means, said control means controls said
interface means, so that a clock signal inputted from said connected
conditional access module via said first connecting means is outputted
to said decoding means, a control signal inputted from said
demodulator via said first connecting means is outputted to said
10 connected conditional access module via said first connecting means,
and a control signal inputted from said connected conditional access
module via said first connecting means is outputted to said
demodulator via said first connecting means.

15 10. The digital television receiver module as claimed in claim 8 or
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wherein said second type conditional access module is a
conditional access module of a CableCARD.

11. The digital television receiver module as claimed in any one
20 of claims 1 to 10, further comprising further interface means for
connecting a third type conditional access module to said interface
means and said control means.

12. The digital television receiver module as claimed in claim 11,
wherein said third type conditional access module is a conditional
25 access module of an IC card.

13. The digital television receiver module as claimed in claim 11 or 12, further comprising means for selectively switching over between:

(a) a first state that said first connecting means is connected to said interface means; and

5 (b) a second state that said first connecting means is connected to said further interface means.

14. The digital television receiver module as claimed in any one of claims 1 to 13,

10 wherein said digital television receiver module comprises a substrate having a plurality of layers, and

wherein a capacitor layer substrate on which a plurality of thin-film capacitors are mounted and a resistance layer substrate on which a plurality of thin-film resistances are mounted, are sandwiched between a first signal wiring layer substrate and a second signal wiring 15 layer substrate.

15. The digital television receiver module as claimed in any one of claims 1 to 14,

wherein, via said first connecting means, said digital television receiver module can connect to one of the following:

20 (a) a first type external substrate conforming to a first broadcasting system, and comprising a first type demodulator and second connecting means which can connect said first type conditional access module thereto; and

25 (b) a second type external substrate conforming to a second broadcasting system, and comprising a second type demodulator and

second connecting means which can connect said second type conditional access module thereto.

16. The digital television receiver module as claimed in any one of claims 1 to 15,

5 wherein said control means detects a type of said external substrate and a broadcasting system of the inputted digital television signal, based on a type-identifying data signal inputted from said external substrate via said first connecting means, and

10 wherein, based on a detected broadcasting system, said control means controls an operation of said decoding means and switches over among the types of the signals communicated via said first connecting means so as to control said interface means.

17. The digital television receiver module as claimed in claim 16, wherein the type-identifying data signal is generated so as to differ depending on the type of said external substrate, by connecting or not connecting said external substrate to a ground conductor.

18. The digital television receiver module as claimed in claim 16, wherein the type-identifying data signal is a signal of read-out data which is obtained by reading out data stored in a memory mounted on said external substrate so as to differ depending on the type of said external substrate.

19. The digital television receiver module as claimed in claim 18, wherein the broadcasting system includes at least one of DVB-T system, ATSC system and ISDB-T system.

25 20. The digital television receiver module as claimed in any one

of claims 1 to 19, further comprising third connecting means for connecting a plurality of types of function expansion substrates, said plurality of types of function expansion substrates having functions different from each other to expand a function of said digital television receiver module.

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21. The digital television receiver module as claimed in claim 20, wherein said function expansion boards include at least one of a network function expansion board for connection to a network, and a CATV modem function expansion board for connection to a head end of 10 a CATV.

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22. A digital television receiver comprising said digital television receiver module as claimed in any one of claims 1 to 14, and said external substrate,

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wherein said external substrate comprises:

a first type demodulator; and

second connecting means for connecting a first type conditional access module thereto, and

wherein said external substrate is a first type external substrate conforming to a first broadcasting system.

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23. A digital television receiver comprising said digital television receiver module as claimed in claim 20 or 21, and said external substrate,

wherein said external substrate comprises:

a first type demodulator; and

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second connecting means for connecting a first type conditional

access module thereto,

wherein said external substrate is a first type external substrate conforming to a first broadcasting system, and

5 wherein said digital television receiver module further comprises a first type said function expansion substrate.

24. The digital television receiver as claimed in claim 22 or 23, wherein said external substrate includes a plurality of circuits corresponding to a plurality of types of display devices different from each other, respectively, and

10 wherein said external substrate further comprises one of a plurality of types of display interfaces for outputting video signal and audio signal outputted from said digital television receiver module to said display devices.

25. The digital television receiver as claimed in claim 23,
15 wherein each of said displays is one of a liquid crystal display, a plasma display and a CRT display.

26. A digital television receiver comprising said digital television receiver module as claimed in claim 20 or 21, and said external substrate,

20 wherein said external substrate comprises:

a first type demodulator;

second connecting means for connecting a first type conditional access module thereto; and

25 a first type display interface for connecting a first type display thereto,

wherein said external substrate conforms to a first broadcasting system and is a first type external substrate connected to said first type display device.

27. A digital television receiver comprising said digital television receiver module as claimed in any one of claims 1 to 14, and said external substrate,

wherein said external substrate comprises:
a first type demodulator;
second connecting means for connecting a first type conditional access module thereto; and
a first type display interface for connecting a first type display thereto,

wherein said external substrate conforms to a first broadcasting system and is a first type external substrate connected to said first type display device, and

wherein said digital television receiver module further comprises a first type said function expansion substrate.

28. The digital television receiver as claimed in any one of claims 22 to 27,

wherein said digital television receiver module is formed by a first dielectric substrate,

wherein said external substrate is formed by a second dielectric substrate, and

wherein a dielectric constant of said second dielectric substrate is larger than a dielectric constant of said first dielectric substrate.